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Determination of cardiovascular risks in adult individuals and assessment of the level of knowledge of cardiovascular risk factors

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ABSTRACT

Aims: In the last century, the negative effects of factors such as nutrition, intense work tempo and stress on cardiovascular health have been increasing. The importance of preventive health services is increasing and policies are being developed to increase quality. In Family Medicine practice, calculating the cardiovascular diseases (CVD) risk that adult patients who do not have complaints about the cardiovascular system may experience in the coming years becomes important in this sense. Therefore, in this study, we aimed to calculate the ten-year risk of fatal cardiovascular events by the Systematic Coronary Risk Evaluation (SCORE) risk scoring in apparently cardiovascularly healthy individuals presenting to a family medicine outpatient clinic and to plan treatment according to the results. We also aim to evaluate the awareness of CVD risk factors in these individuals by using the Cardiovascular Disease Risk Factors Knowledge Level (CARRF-KL), whose reliability and efficacy have been shown in various previous studies.

Methods: 122 voluntary individuals between the ages of 40-80 were recruited to a family medicine polyclinic for any reason (43 males, 79 females). Participants' awareness was assessed by the CARRF-KL and the 10-year cardiovascular disease risk by the SCORE risk score.

Results: When the participants' SCORE risk averages were examined, 32.8% were low risk, 50.8% middle risk, 10.7% high risk and 5.7% very high risk group. When systolic blood pressure (SBP) levels according to the SCORE risk distribution were evaluated, in 7 patients with a very high risk distribution and the SBP value was higher than 130 mmHg, 2 of which were in the range of 130-139 mmHg, and 5 of them were above 140 mmHg. There was a statistically significant correlation between total cholesterol and low-density lipoprotein cholesterol levels and SCORE risk score distribution of lipid profile distributions of participants ($p<0.05$). This relationship was not detected in high-density lipoprotein cholesterol and triglyceride levels. The mean scores of the men in the study group on the CARRF-KL scale were 24.83, while the women were 24.31 and there was no difference between the gender. When the CARRF-KL scale mean scores were compared with the SCORE risk score distribution, no significant difference was found between the groups ($F=1.026$, $p=0.384$).

Conclusion: Our study suggests that SCORE risk assessment in cardiovascular disease is an easy assessment that can routinely be performed in family medicine outpatient clinics. It is possible that cardiovascular diseases can be detected and prevented in advance by the spread of clinical measures such as SCORE and risk measures such as CARRF-KL.

Keywords: Cardiovascular disease, risk factors, knowledge level, SCORE, CARRF-KL

INTRODUCTION

Cardiovascular diseases (CVD) are the most important cause of morbidity and mortality in our country as well as worldwide.[1,2] Especially in the last century, more and more adverse effects on cardiovascular health have been observed over time due to factors such as diet, busy work schedules, stress, etc.[3-5] In order to reduce such adverse effects, policies are tried to be produced by official institutions in our country and around the world.

In order to prevent and reduce the prevalence of CVDs, risk management has taken its place among the most prioritized issues. The quality of preventive health services is increasing in our country as well as in the whole world. In fact, the protection and improvement of cardiovascular health are in an important position within these services that gather many different functions together.

In Family Medicine practice, the calculation of the CVD risk that adult patients without complaints related to the cardiovascular system may experience in the following years constitutes one of the most important pillars of the principle of protection and promotion of cardiovascular health.[6] However, a practical and economical scale should be used for such a risk calculation. One of the scales widely used for this purpose all over the world is the Systematic Coronary Risk Evaluation (SCORE) Risk Scale.[7]

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Therefore, in this study, we aimed to calculate the ten-year risk of fatal cardiovascular events by SCORE risk scoring in apparently cardiovascularly healthy individuals presenting to a family medicine outpatient clinic and to plan treatment according to the results. We also aim to evaluate the awareness of CVD risk factors in these individuals by using the Cardiovascular Disease Risk Factors Knowledge Level (CARRF-KL) Scale, whose reliability and efficacy have been shown in various previous studies.[8]

METHODS

Ethics

The approval of Clinical Research Ethics Committee of Erciyes University, dated 20.07.2017 and numbered 01/2017-47 was obtained before the study, and it was conducted in accordance with the Declaration of Helsinki.

Sample

The study included 122 adult volunteers aged 40-80 years who applied to Erciyes University Family Medicine outpatient clinic for any reason between July 2017 and December 2017. Sociodemographic characteristics such as age, gender, educational status, and smoking status were questioned. Glucose, hemoglobin A1C (HbA1C), blood urea nitrogen (BUN), creatinine (Cre), high-density lipoprotein cholesterol (HDL), triglyceride (TG), low-density lipoprotein cholesterol (LDL), and total cholesterol levels were also measured. The data obtained were calculated with the SCORE risk scale, and the 10-year CVD mortality risk of the patients was determined. Exclusion criteria were cerebrovascular disorder, chronic kidney disease, diabetes mellitus, peripheral artery disease and CVD.

SCORE Risk Scale

Patients' age, gender, smoking status, systolic blood pressure (SBP), total cholesterol values, and 10-year CVD mortality risks from the SCORE risk scale table were classified as low risk, intermediate risk, high risk, and very high risk. The calculated risk was classified as low risk if <1%, intermediate risk if between 1-5%, high risk if ≥5-<10%, and very high risk if ≥10%.

CARRF-KL Scale

A validated and reliable cardiovascular disease risk factor knowledge level scale was used to measure the level of knowledge about CVD risk factors in adults. The first four items in the scale were related to the characteristics and preventability of CVDs and the age factor, while 15 items asked about risk factors (items 5, 6, 9-12, 14, 18-20, 23-25, 27, 28) and 9 items (items 7, 8, 13, 15, 16, 17, 21, 22, 26) asked about the result of change in risk behaviors.8 Individuals were asked to answer the questions as 'yes', 'no', and 'don't know', and 1 point was given for each correct answer. The 28 questions on the scale were evaluated as a total score without subdividing them into subgroups.

Statistical Analysis

The SPSS 22.0 package program was used for statistical analysis of the data. Categorical measurements were summarized as numbers and percentages, and numerical measurements were summarized by interpreting the mean, standard deviation (minimum and maximum where necessary), and significance level. Since the sample size was over 30, the assumption that numerical measurements were normally distributed was accepted. In cases where the dependent variable was continuous and the independent variable was categorical, an ANOVA and an independent sample t-test were performed. In ANOVA tests, the Tukey test, one of the post-hoc tests, was used to determine from which group the significant differences originated. In cases where the dependent and independent variables were categorized, a chi-square test was performed and tabulated. The reliability of the SCORE Risk Scale on the selected sample was tested with Cronbach's alpha, and the reliability value was found to be 0.84. The statistical significance level (p) was taken as <0.05 in all tests.

RESULTS

Of the study group, 49 (40.2%) were male and 73 (59.8%) were female. The mean age was 50.16 ± 9.09 years (range 40-79). 62.3% of the participants were under 50 years of age, 23.7% were between 51 and 60 years of age, 9.8% were between 61 and 70 years of age, and 4% were in the 71 and over age group.

The mean values of cardiovascular disease risk factors are given in the **Table 1**. The mean systolic blood pressure (SBP) was 128.13 mmHg, and the mean DBP was 79.86 mmHg. A total of 37 patients (30.3%) had blood pressure levels above 140/90 mmHg at admission. The mean total cholesterol and TG levels were 204.15 ± 42.08 mg/dl and 171.66 ± 123.39 mg/dl, respectively. The mean LDL cholesterol was 119.68 ± 36.69 mg/dl, and the mean HDL cholesterol was 49.68 ± 13.49 mg/dl.

Table 1. Average values of cardiovascular disease risk

Variables	Mean ± SD
HbA1C (%)	5.35 ± 0.42
Glucose (mg/dl)	94.89 ± 12.16
Total cholesterol (mg/dl)	204.15 ± 42.80
Triglyceride (mg/dl)	171.66 ± 123.39
Low-density lipoprotein (mg/dl)	119.68 ± 36.69
High-density lipoprotein (mg/dl)	49.68 ± 13.49
Blood urea nitrogen (mmol/L)	13.04 ± 3.16
Creatinine (mg/dl)	0.84 ± 0.58
Systolic blood pressure (mmHg)	128.13 ± 16.27
Diastolic blood pressure (mmHg)	79.86 ± 11.15

According to the SCORE risk scoring system, 40 (32.8%), 62 (50.8%), 13 (10.7%), and 7 (5.7%) participants had a low, moderate, high, and very high 10-year risk of death due to CVD, respectively. SCORE risk scale averages are given in **Figure 1**.

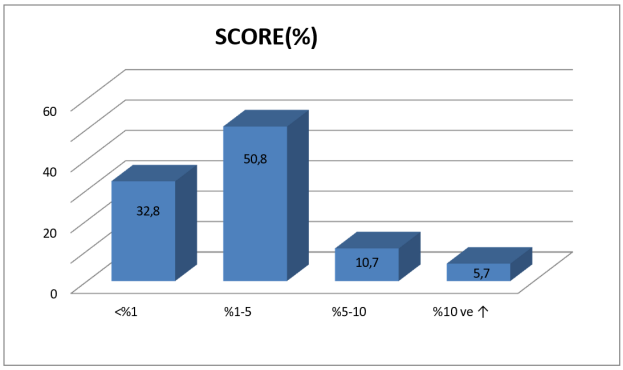

Figure 1. SCORE risk scale averages

When a comparison was made according to gender in the study, it was found that men had significantly higher HbA1C (p=0.021), triglyceride level (p=0.001), BUN (p=0.0001) and creatine (p:0.001) values but significantly lower HDL (p:0.0001) values than women. There was no difference between genders in glucose, total cholesterol, LDL levels, or SBP and DBP (**Table 2**).

Table 2. Significance of cardiovascular risk factors according to gender variable

Variables	Male (n=49) Mean	Female (n=73) Mean	Total Mean	F	P-value
HbA1C (%)	5.46	5.28	5.35	0.328	0.021*
Glucose (mg/dl)	97.2	93.34	94.8	7.138	0.086
Total Cholesterol (mg/dl)	204.61	203.84	204.22	0.061	0.924
Triglyceride(mg/dl)	217.91	140.61	171.6	10.86	0.001*
Low-density lipoprotein(mg/dl)	117.78	120.96	119.37	0.003	0.64
High-density lipoprotein (mg/dl)	43.15	54.06	49.6	0.254	0.0001*
Blood urea nitrogen (mmol/l)	14.55	12.02	13.04	0.1	0.0001*
Creatinine (mg/dl)	1.06	0.69	0.84	3.233	0.001*
Systolic Blood Pressure (mmHg)	131.24	126.05	128.13	0.115	0.084
Diastolic Blood Pressure (mmHg)	81.97	78,45	79.86	1.045	0.087

*p<0.05

Table 3. Distribution of study parameters according to SCORE risk distribution

Variables	SCORE risk %				p
	<1 (n=40)	>1- <5 (n=62)	>5-<10 (n=13)	% 10 ve üzeri (n=7)	
Gender					
Female	33 (82.5)	31 (50.0)	6 (46.2)	3 (42.9)	0.003*
Male	7 (17.5)	31 (50.0)	7 (53.8)	4 (57. l)	
Marital status					
Married	36 (90.0)	53 (85.5)	13 (100.0)	7 (100.0)	0.503
Single	4 (10.0)	9 (14.5)	0 (0.0)	0 (0.0)	
Education status					
Illiterate	0 (0.0)	1 (1.6)	0 (0.0)	0 (0.0)	0.780
Primary school	9 (22.5)	14 (22.6)	3 (23.1)	3 (42.9)	
Middle school	1 (2.5)	5 (8.1)	0 (0.0)	0 (0.0)	
High school	11 (27.5)	13 (21.0)	4 (30.8)	3 (42.9)	
University	19 (47.5)	29 (46.8)	6 (46.2)	1 (14.3)	
Smoking					
Yes	3 (7.5)[a]	29 (46.8)	2 (15.4)	1 (14.3)	0.001*
No	37 (92.5[a]	33 (53.2)	11 (84.6)	6 (85.7)	
Systolic blood pressure (mmHg)					
<130	30	31	5	0	0.0001*
130-139	10	11	3	2	
>140	0	20	5	5	
Diastolic blood pressure (mmHg)					
<85	35	38	9	4	0.177
85-89	2	10	2	1	
>90	3	14	2	2	

*p<0.05

Among the study group, 71.3% (n=87) were non-smokers, and 28.7% n=(35) were smokers. Of the study group, 0.8% were illiterate, 23.8% were in primary school, 4.9% were in middle school, 25.4% were in high school, and 45.2% were university students. Of the participants, 89.3% (n=109) were married, and 10.7% (n=13) were single. When the relationship between SCORE risk distribution and study parameters was examined, it was found that being married/single and being literate were not associated with SCORE risk score distribution. When the smoking status of the participants was examined in detail, it was found to be significantly associated with the SCORE risk score distribution. When all participants were divided into three groups according to SBP and DBP values, when the relationships between the SCORE risk score distribution and the SCORE risk score distribution of the participants classified according to their blood pressure values were examined, a statistically significant relationship was found between SBP stages and score risk score distribution and blood pressure, while this relationship was not observed in DBP stages (**Table 3**).

Fasting blood glucose value distribution was not associated with SCORE risk score distribution. However, there was a statistically significant relationship between total cholesterol, LDL levels, and SCORE risk score distribution. This relationship was not found in HDL and TG levels (**Table 4**).

Table 4. Distribution of laboratory findings according to SCORE risk distribution

Variables		Score Risk Values				P
		<%1 (n=40)	>1- <5 (n=62)	>5-<10 (n=13)	>%10 (n=7)	
Fasting blood glukose(mg/dl)	<100	32	48	8	4	0.362
	>100	8	14	5	3	
Total Cholesterol (mg/dl)	<190	21	23	2	1	0.045*
	>190	19	39	11	6	
Low-density lipoprotein (mg/dl)	<115	25	34	2	3	0.027*
	>115	15	28	11	4	
High-density lipoprotein (mg/dl)	Male<40	5	17	3	2	0.097
	Male>40	2	14	4	2	
	Female<45	8	7	2	0	
	Female>45	25	24	4	3	
Triglyceride (mg/dl)	<150	22	33	4	2	0.276
	>150	18	29	9	5	

*p<0.05

There was no significant difference (p=0.147) when the mean scores (24.83) of the men in the study group on the CARRF-KL Scale were compared with the mean scores (24.31) of the women. When the study was analyzed according to age, it was observed that the average of the scores obtained from the CARRF-KL scale by the group under 50 years of age was 24.43, the average of the scores obtained by the group between 51-60 years of age was 24.74, the average of the group between 61-70 years of age was 23.90, and the average of the group between 71 and over was 24, and the difference between the averages was not significant (F=0.853, p=0.682). It was observed that the CARRF-KL scale did not show a significant variation between genders, smoking, and age. Illiterate people scored 23, primary school graduates 23.58, secondary school graduates 23.66, high school graduates 24.22, and university graduates 25.30 on average. It was observed that the difference between the averages was significant (F=5.173, p=0.001) (**Table 5**).

Table 5. Evaluation of the CARRF-KL Scale according to its variables

Variables		n	Ort	P
Gender	Male	49	24.83	0.147
	Female	73	24.31	
Smoking	Yes	35	24.28	0.392
	No	87	24.62	
Marital status	204.61	203.84	204.22	0.075
	Married	109	24.63	
Age	Under 50	76	24.43	0.682
	51-60	29	24.74	
	61-70	12	23.9	
	71 and over	5	24	
Education status	Illiterate	1	23	0.001*
	Primary school	29	23.58	
	Middle school	6	23.66	
	High school	31	24.22	
	University	55	25.3	
Tukey (education status)	Primary school	55-29	1.72	0.0001*
	High school	55-31	1.08	0.045*
Presence of heart disease in the family	Primary school	55-29	1.72	0.013
	High school	55-31	1.08	

*p<0.05

When the mean values of the CARRF-KL scale were compared with the SCORE risk score distribution, it was observed that there was no significant difference between the groups (F=1.026, p=0.384) (**Table 6**).

Table 6. Distribution relationship between CARRF-KL scale and SCORE risk score

	SCORE	n	%	F	P
CARRF-KL Scale	<1%	40	32.8	1.026	0.384
	l-5%	62	50.8		
	5-10%	13	10.7		
	10% and above	7	5.7		

DISCUSSION

In our study, it was observed that the level of knowledge and awareness about CVD was higher in the study group compared to previous studies. By increasing the level of awareness, the emergence of chronic diseases such as CVD can be prevented or at least delayed. In patients, the rate of progression of the disease can be slowed down, and the survival period can be prolonged. Our study showed that with the application of SCORE risk scoring, it will be possible to increase the number of patients diagnosed and the number of patients treated. For this purpose, it would be an important step to install risk scoring on the follow-up screens of primary care physicians.

Health professionals working in primary care have important responsibilities in preventing CVD or other chronic diseases, identifying risky individuals and directing them to early diagnosis and treatment, and reducing possible complications by raising awareness in the community, educating individuals, providing healthy living habits, and ensuring their compliance with treatment when they become ill. Primary prevention is very important in CVD, which are among the most common diseases of our day and one of the leading causes of death worldwide, and therefore early diagnosis and treatment are extremely important.[9,10] In addition, most acute cardiovascular events occur in a clinically asymptomatic patient population. Today, despite the recent emphasis on primary treatment approaches for prevention in CVD management, it has still not reached the desired level.

One of the most recent and widely accepted guidelines, the European Guidelines for Cardiovascular Disease Prevention in Clinical Practice, recommends the use of the SCORE system based on prospective data from a diverse and large European population. CVD risk scores such as the SCORE assess the risk of developing CVD and the risk of death from CVD in apparently healthy subjects, i.e., those with no clinical or pre-clinical symptoms. In our study, we used the SCORE risk scale because it is in the form of easy-to-understand colored tables and is easier to calculate than other risk factors, thus causing less time loss in outpatient clinic conditions. Indeed, in previous studies, it was found that the SCORE risk score was associated with tomographically measured coronary calcium score and intravascular ultrasonographically assessed coronary plaque burden.[11-13]

When SCORE risk scoring factors were analyzed one by one, total cholesterol values were found to be compatible with WHO values.[14] In addition, the values in Istanbul, one of the cities where the Turkish Adult Risk Factor (TEKHARF) study was conducted, were close to our values.[15] Again, as a result of the TEKHARF study, it was shown that the values of TG in our society are high when compared to other countries, and it is said that this high level is more pronounced, especially in men.[15] In our study, although TG values were higher in men, we did not find a statistically significant relationship between high TG and SCORE risk scoring. When HDL was evaluated, 53% of men and 23.2% of women were included in this group when HDL < 45 mg/dl in women and < 40 mg/dl in men, according to SCORE Scoring. The fact that the desired values in HDL levels could not be reached both in our study and in other studies may be explained by the fact that genetic factors that directly affect HDL, such as causing hyperinsulinism, abdominal obesity, atherosclerosis, and hypertriglyceridemia, have not been sufficiently progressed in the primary detection or treatment of these conditions, and that exercise, which is perhaps the most important non-drug treatment for lowering HDL in Turkish people, has not been sufficiently introduced into our lives.[15-17] It is noteworthy that the rate of smoking in our study group showed a decrease compared to the results of the TEKHARF study.[15,18] In the study conducted by Akoğlu et al.[18], it was found that 52.3% of the patients had never smoked, 27.5% had smoked, and 20.2% had smoked before and quit. In the Framingham Heart Study, every 10 mmHg increase SBP increased the risk of fatal and non-fatal CVD by 16%, including both sexes. In our study, the prevalence of hypertension at presentation (>140/90 mmHg) among the participants was found to be 30.3%. Although it is higher than the study by Sözmen et al.[19], it is compatible with the prevalence of hypertension obtained in the Turkish Hypertension Prevalence Study and the study by Lamm et al.[20,21] When all risk factors were evaluated, most participants in our study (n=102, 83.6%) were in the low and intermediate risk groups. We attributed the fact that most of the participants in our study were in the low and intermediate risk groups to the low risk profile of the participants, that is, the absence of CVD risk factors.

The CARRF-KL scale, whose reliability and validity have

been proven in the Turkish population, is used to determine the knowledge level of the participants about the risk of developing CVD.[22] Al Hamarneh et al.[23] and Jafary et al.[24] also reported that individuals with a family history of heart disease had a higher level of knowledge. In studies conducted by Thanavaro et al.[25], Frijling et al.[26], and Al Hamarneh et al.[23], it was found that the mean CARRF-KL score increased as the level of education increased. However, in Sözmen et al.[19] study, it was found to be inversely proportional to educational status. In our study, in line with the literature, we found that the participants' education level and the presence of a family history of heart disease were associated with the CARRF-KL scale score. The effect of educational status on the increase in the CARRF-KL scale score is obvious, but the effect of the presence of a family history of CAD may be explained by increased awareness of the disease and thus increased awareness of potential risk factors.

Scalzi et al.[27] found that age was an important determinant of risk awareness, and awareness was better in younger patients. In another study by Antsoy et al.[28], the CARRF-KL scale score was reported to be higher in women. According to another study by Sözmen et al.[19], the level of knowledge increased with increasing age, being married, and working in an income-generating job. The results of CARRF-KL, which were found to be different as a result of all these studies, suggest that awareness, contrary to what is known, shows variability in participants away from classical information. In addition, the higher rates in our study compared to previous studies can be explained by the increased awareness activities in both visual and written media over the years, especially the warning labels on cigarette packs, such as the warning labels on cigarette packs made by the relevant associations on risk factors such as hypertension and smoking.

Study Limitations

The number of patients was limited. The fact that it was only a single city and a single center may prevent the results from being generalized to the entire population. Test-retest reliability and convergent validity, which should be considered in future studies, were not evaluated in this study. The non-probability convenience sampling method introduces selection bias. Individuals included in the study may be either less knowledgeable or more knowledgeable than the general population. Therefore, it may differ from the actual knowledge situation of the public. Calculating a knowledge score based on correct answers to a set of questions is somewhat arbitrary and may not capture the different weights that may be given to different questions. However, we think this score provides a fair estimate of the individual's level of knowledge.

CONCLUSION

In order to measure awareness of cardiovascular risk factors, up-to-date epidemiologic data systems should be established. For this purpose, it was concluded that it would be beneficial to determine the risk scales after identifying the individuals with CVD risk factors among the individuals applying to primary health care institutions, to increase the information about cardiovascular risk factors, and to increase the practices to increase awareness. The risk resulting from the combination of risk factors is greater than the risk resulting from their individual presence. Our study showed that the number of patients diagnosed and the number of patients treated can be increased by applying the SCORE risk scoring recommended by ESC and TKD. For this purpose, it would be an important step to install risk scoring on the follow-up screens of primary care physicians.

ETHICAL DECLARATIONS

Ethics Committee Approval: The approval of Clinical Researches Ethics Committee of Erciyes University, dated 20.07.2017 and numbered 01/2017-47 was obtained before the study, and it was conducted in accordance with the Declaration of Helsinki.

Informed Consent: All patients signed and free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declared that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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